Service Handbook

HP x4000 Workstation

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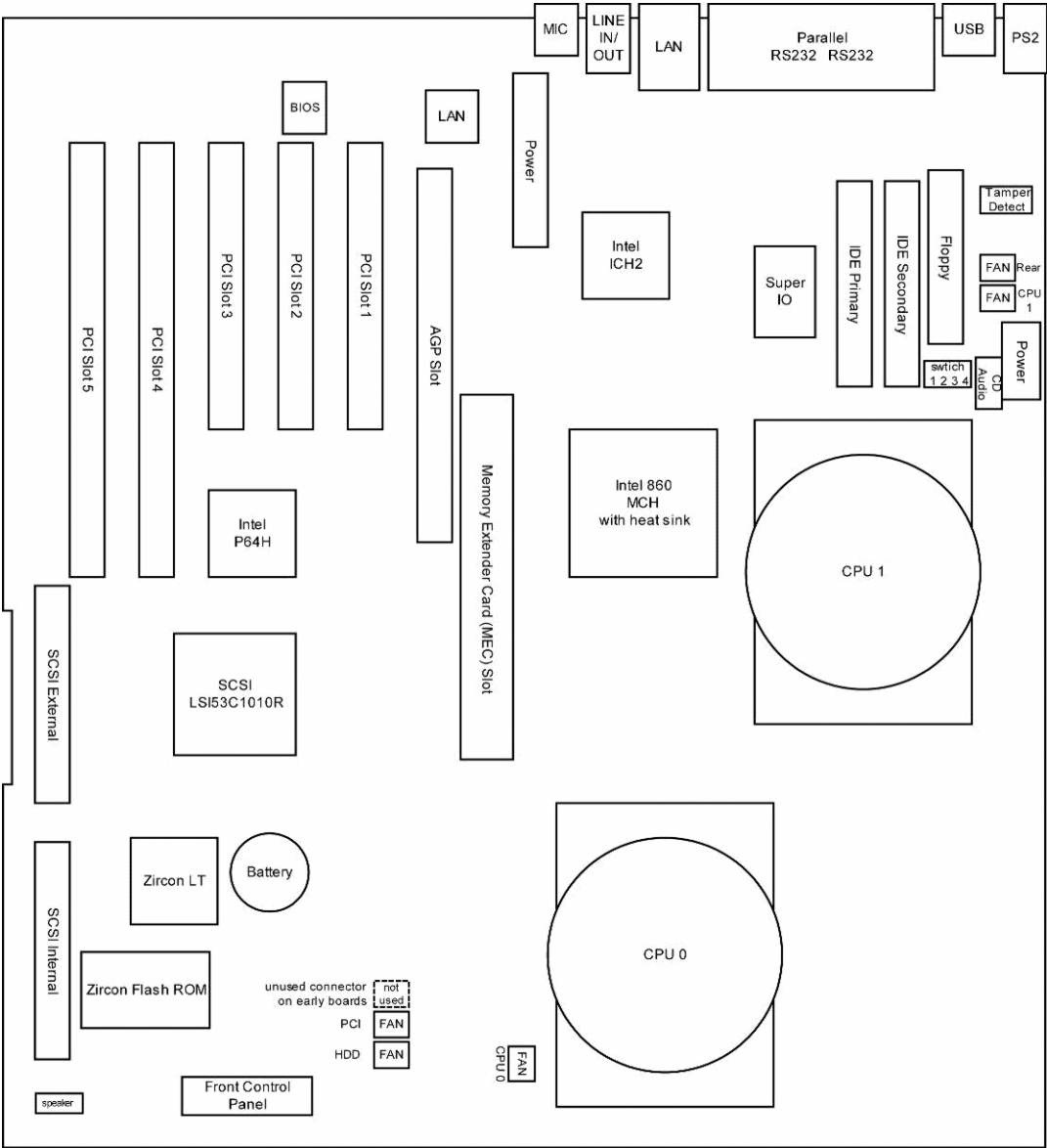
Overview

This chapter contains information about:

- "x4000 System Board" on page 7
- "BIOS Identification" on page 9
- "Upgrading Memory" on page 10
- "Replacing or Upgrading a Processor" on page 13

Chapter 2 contains ordering information for x4000 accessories.

Chapter 3 contains ordering information for x4000 parts.

x4000 System Board

System Board Switches

The system board includes a 4-pole DIP switch, which lets you configure BIOS functions. Because the switches are read only at system start up, you must change the switch positions when the Workstation is shut down.

Switch	Function	Default	Comment
1	Clear BIOS password	Off	Clears both Administrator and User passwords, if they have been set.
2	Boot block recovery	Off	Forces a boot block recovery from a bootable BIOS flash disk in the floppy disk drive.
3	Clear CMOS	Off	Reset CMOS settings to BIOS defaults. You can also do this with the F9 key in the Setup program as described in "Clearing the CMOS" on page 48.
4	Enable safe mode	Off	Force processors to run at 800 MHz. This can be used as a troubleshooting tool or to correct a problem after adding a second processor. Before using this, flash the BIOS as described at www.hp.com/workstations/support. Use this switch as a last resort. If it gets the system running, replace the processors. If the problem persists, replace the system board.

BIOS Identification

The system BIOS is identified by the version number *XX.YM.mm*, where:

- *XX* is a two-letter code indicating the system
- *Y* is a one-letter code indicating the HP entity
- *M* is the major BIOS version
- *mm* is the minor BIOS version

Upgrading Memory

The memory for the HP x4000 Workstation is located on a Memory Expander Card, which plugs into the system board.

There are two memory banks (RDRAM channels):

- Bank I includes sockets 1B (J1), 2B (J2), 1A (J5), and 2A (J6).

- Bank II includes sockets 3B (J3), 4B (J4), 3A (J7), and 4A (J8).

This allows for a total of 8 RIMMs.

You must adhere to the following rules when loading memory:

- RIMMs must be loaded in *matched pairs*. Matching RIMMs have the same RDRAM size, speed and Mbit technology.

- Each RDRAM bank (channel) must be either completely empty or completely filled as shown in Figure 1-2. Therefore, if only one pair of RIMMs is installed in a bank, then the remaining sockets in the bank must contain continuity modules (CRIMMs) to ensure continuity.

NOTE   All Workstations (unless they already have 8 RIMMs) ship with a pair of CRIMMs in case they are needed in future memory configurations. CRIMMS may be stored in an unused memory bank.

Figure 1-1   x4000 Memory Expander Card (MEC)

2A (J6)
1A (J5)
4A (J8)
3A (J7)
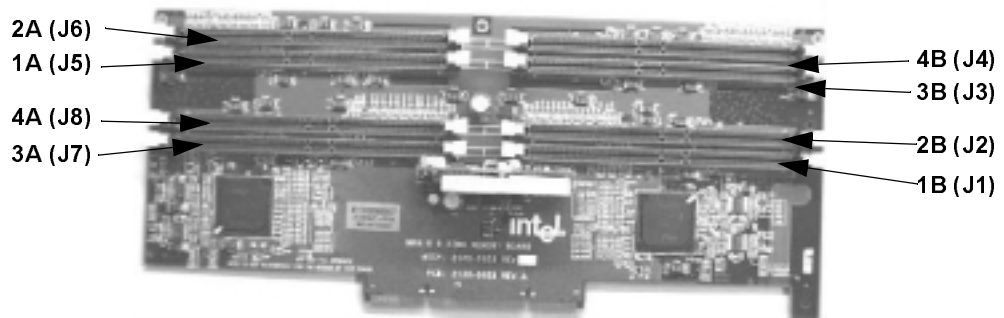
4B (J4)
3B (J3)
2B (J2)
1B (J1)

Memory Bank I consists of:

RIMM pair 1: 1A (J5) and 1B (J1)
RIMM pair 2: 2A (J6) and 2B (J2)

Memory Bank II consists of:

RIMM pair 3: 3A (J7) and 3B (J3)
RIMM pair 4: 4A (J8) and 4B (J4)

*If a memory bank only contains 1 pair of RIMMs, the remaining
2 connectors must contain CRIMMs to ensure continuity.*

Figure 1-2   **Replacing or Upgrading Memory**

1 Pair of RIMMs

CRIMM

RIMM 1A

CRIMM

RIMM 1B

P1 - edge

2 Pairs of RIMMs

RIMM 2A

RIMM 1A

RIMM 2B

RIMM 1B

P1 - edge

Memory
Bank I

3 Pairs of RIMMs

RIMM 2A

RIMM 1A

CRIMM

RIMM 3B

CRIMM

RIMM 3A

RIMM 2B

RIMM 1B

P1 - edge

4 Pairs of RIMMs

RIMM 2A

RIMM 1A

RIMM 4A

RIMM 3A

RIMM 4B

RIMM 3B

RIMM 2B

RIMM 1B

P1 - edge

Memory
Bank II
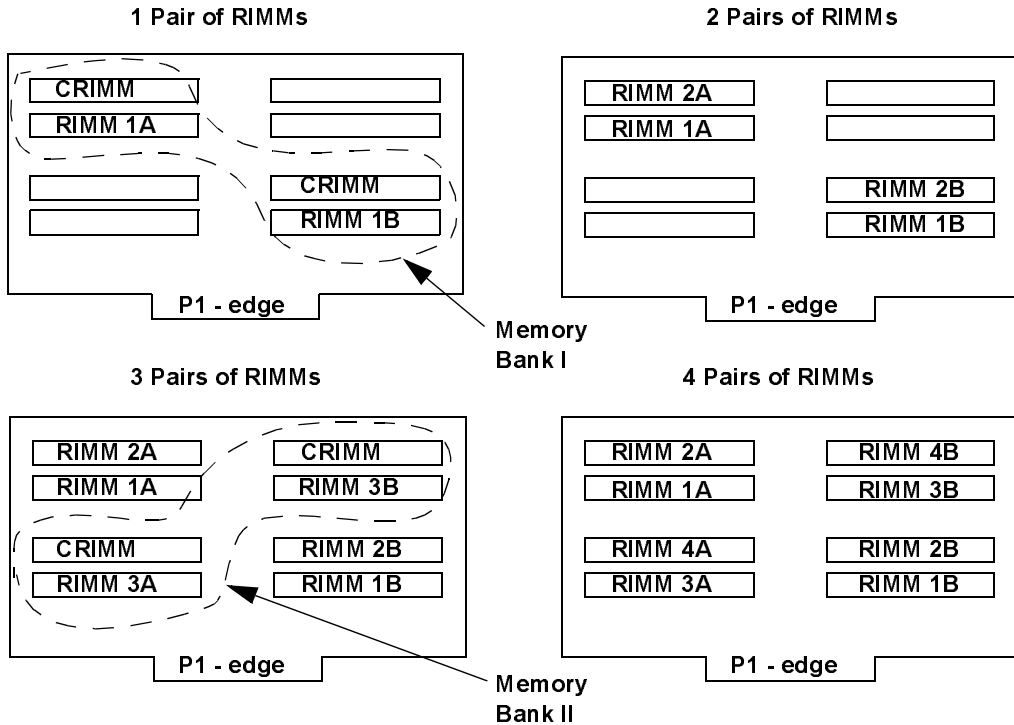
Note: RIMM 1A and 1B are a matched pair, 2A and 2B are a matched pair,
3A and 3B are a matched pair, and 4A and 4B are a matched pair.

Replacing or Upgrading a Processor

The x4000 Workstation can have two processors. The processors must be identical.

CAUTION   If you are upgrading your current processor, you must update the BIOS. The latest BIOS is located at www.hp.com/workstations/support.

If you are adding a second processor, you must update your operating system (see "Updating Your Operating System" on page 16).

Removing a Processor

CAUTION   Before removing your processor, turn on the Workstation and let it run for 3 to 5 minutes. This warms up the processor and makes it easier to detach the heatsink. *Be very careful when removing the heatsink*. If your processor turbo cooler fan is not operating, the heatsink may be very hot. Under normal circumstances, the turbo cooler fan is operational and a slight twist of the heatsink should release it from the processor.

To remove a processor:

1. Turn off the display and shut down the Workstation. Disconnect all power cables and any LAN or telecommunications cables.

2. Remove the Workstation's cover.

3. Place the Workstation on its side for better access.

4. Open the hard disk drive cage.

5. Remove the Chassis Beam Assembly.

6. Remove the MEC card.

7. Remove the heatsink power connector from the system board.

8. Remove the two heatsink clips by pressing the release lever on the clips. Then lift off the heatsink. There is a thermal interface material between the heatsink and the processor. This may cause the processor to stick to the heatsink.

Figure 1-3   **Removing a Processor**

Step 8

Step 10
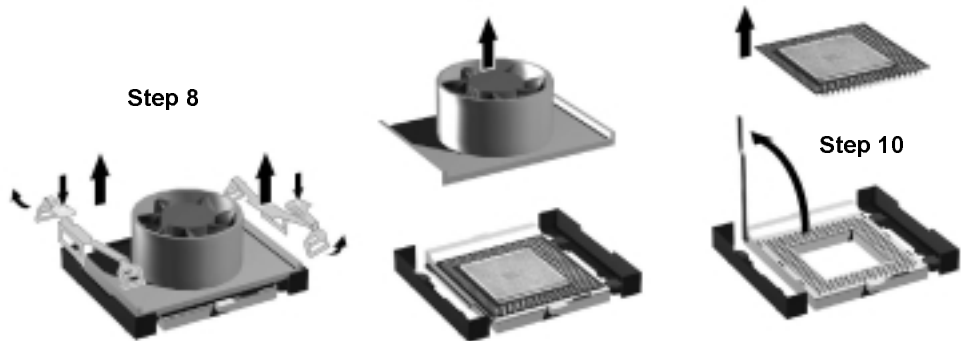
9. Remove the thermal interface material from the heatsink and discard it. You can leave any residue that remains on the heatsink. This does not impair the heat transfer.

10. Open the Zero Insertion Force (ZIF) lever, located at the side of the processor socket, until it is in the vertical position (depending on the socket design, the handle may need to go past vertical), then carefully lift out the processor. To avoid bending the processor pins, keep the processor perfectly flat when removing it.

11. Store the processor in an anti-static bag (such as the one provided with the replacement processor).

12. If you are permanently removing a second processor, you must update your operating system (see page 16). You should also store the heatsink and clips in a safe place.

Installing a Processor

To install a processor:

1. Turn off the display and shut down the Workstation. Disconnect all power cables and any LAN or telecommunications cables.

2. Remove the Workstation's cover.

3. Place the Workstation on its side for better access.

4. Open the hard disk drive cage.

5. Remove the Chassis Beam Assembly.

6. Remove the MEC card.

7. Ensure the processor is correctly oriented by matching the notches on the processor to the notches on the ZIF socket. Then carefully lower the new processor into place. When the processor is fully inserted, close the ZIF lever.

CAUTION   Be extremely careful when you insert the processor. If you bend one of the pins, it will not go into the socket.

Figure 1-4   Inserting a Processor
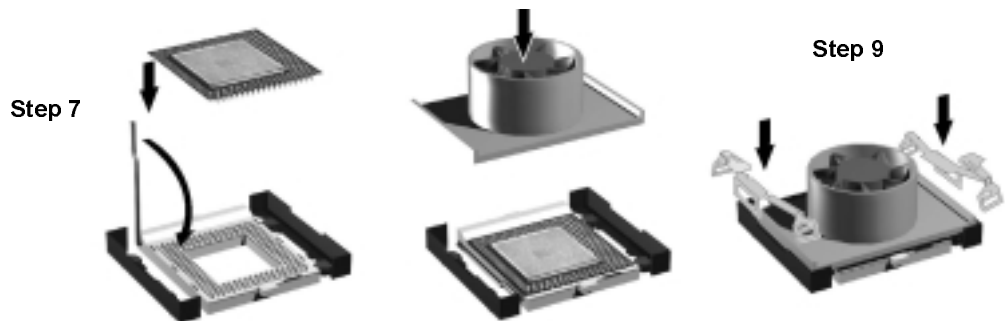
8. Affix the new thermal interface material, provided with the new processor, to the top of the processor.

9. Attach the heatsink to the processor. Use the retaining clips to attach the heatsink. For easier installation, partially attach both clips by hooking one end of the side slot in each clip. Press down on the remaining ends of both clips until they click into place.

10. Connect the heatsink turbo fan power connector to the system board. The fan connectors are labeled CPU0 and CPU1 on the system board.

11. Replace the MEC card.

12. Replace the Chassis Beam Assembly.

13. Close and secure the hard disk drive cage.

14. Replace the Workstation's cover.

15. Reconnect all the power and telecommunications cables.

16. Update your operating system (see page 16).

Updating Your Operating System

If you are adding a second processor to a Workstation (or removing a processor), you must update the operating system to reflect these changes.

Windows 2000

To update the operating system in Windows 2000:

1. Go to the Control Panel by selecting **Start > Settings > Control Panel**.

2. Select the **System** icon.

3. In the Hardware tab, select **Device Manager**.

4. Expand the **Computer** branch. The type of support that you currently have is displayed:

    • **ACPI UniProcessoor PC**

    • **ACPI MultiProcessor PC**

    To change the type of support, double click on this icon to bring up the ACPI PC properties.

5. In the Driver tab, select **Update Driver**. The Upgrade Device Driver Wizard appears and you must select **Next** to continue.

6. Choose to display a list of all the known drivers and click **Next**.

7. When all the drivers are located, click the radio button to show all hardware of this device class, select one of the following and click **Next** to install the new driver:

    • **ACPI MultiProcessor PC** if you have added a second processor.

    • **ACPI UniProcessoor PC** if you have removed your second processor.

Windows NT

To update your operating system in Windows NT, use the HP DualExpress utility which is posted at **www.hp.com/workstations/support.**

2 Accessory Ordering Information

Supported Accessories

Intel Xeon Processors	
1.5 GHz	A6078A
1.7 GHz	A6079A
System RAM	
256 MB PC800 RDRAM (1 pair 128 MB RIMMs)	A6081A
512 MB PC800 RDRAM (1 pair 256 MB RIMMs)	A6082A
Hard Disk Drives	
18 GB Ultra3 SCSI hard disk, 10k rpm	A5995B
36 GB Ultra3 SCSI hard disk, 10k rpm	A6060A
Removable Mass Storage	
48X IDE CD-ROM drive	A7209A
12X IDE CD-Writer drive	A7212A
12X DVD drive	A7211A
Graphics Cards	
Matrox Millennium G450 dual 16MB graphics card	A7192A
nVidia Quadro2-MXR graphics card	A6064A
nVidia Quadro2-PRO graphics card	A6065A
ATI FireGL2 3D graphics card	A6076A
ATI FireGL4 3D graphics card	A7226A
Monitors	
HP LCD 18"	D5069W
HP 19" Color	D8912W
HP 21" Color	D8915W
Power Cords	A4199B
Korea (AB1)	
Europe (ABB)	
China (AB2)	
Hong Kong & Singapore (AB5)	

North America (ABA)

Australia (ABG)

Japan (ABJ)

Argentina (AC8)

United Kingdom (ACC)

Switzerland (ACD)

South Africa (ACQ)

South America (AKH)

Israel (AKJ)

Mass Storage Device Guide Rails

Extra guide rails are attached to the side of the Workstation chassis for additional mass storage device installations. Depending on the device to be installed, dedicated guide rails are required and are easily recognized by their distinct size and color.

The following table indicates the device, location, and required rails.

Device to be Installed	Location	Required Rails	Installing the Rails
5.25-inch device (CD-ROM, etc.)	5.25-inch front access cage shelf	Wide black rails	There is no specific side to which these guides must be installed. However, they must be inserted in the two holes located at the bottom of the drive.
3.5-inch device (floppy, zip drive, etc.)		Narrow green left and right rails	Carefully break off the metal plate from the chassis. Insert the guide rail labeled "L" on the left-hand side (cable connectors facing towards you and positioned at the top), and the guide rail "R" on the right-hand side of the hard disk drive.

3 HP x4000 Parts Information

x4000 Parts and Part Numbers

1

1a

1d

1b

1g

2

2b

1e

1f

2a

1c

3
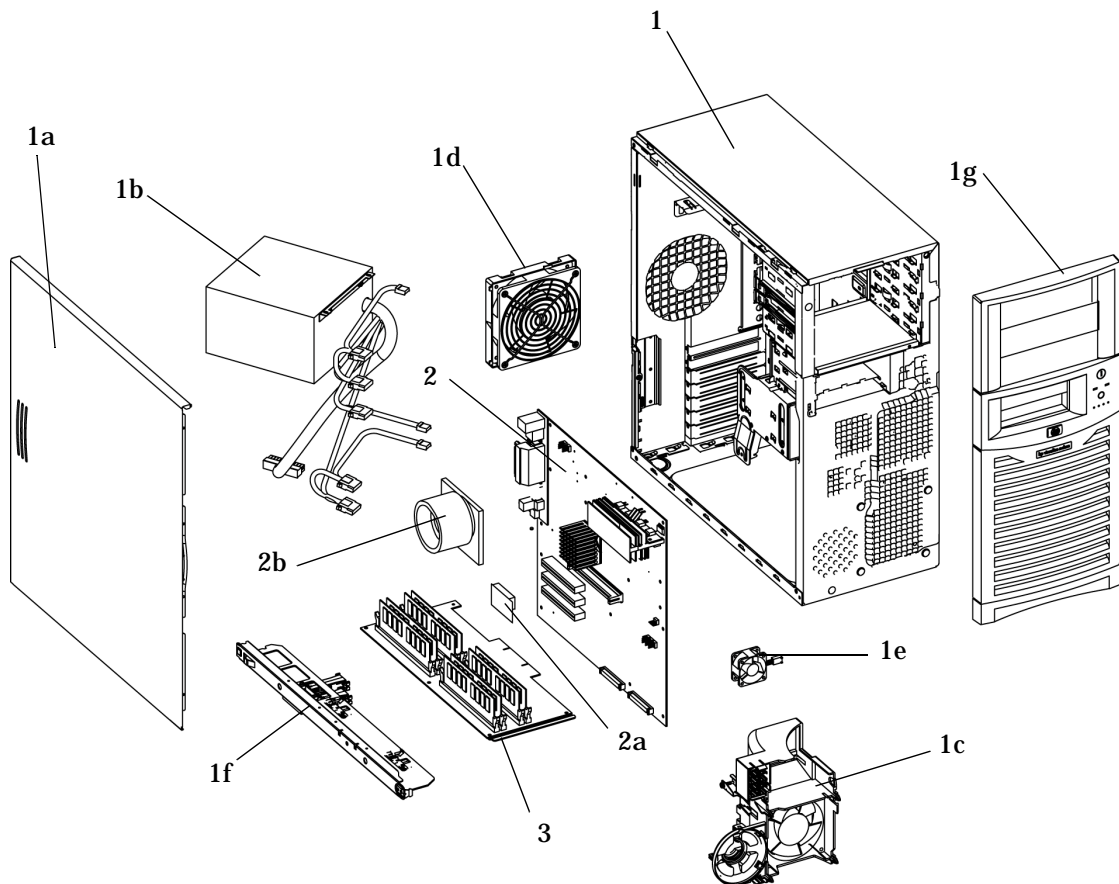
Table 3-1 Parts List

Item	Description	Replacement Part Number	Exchange Part Number
Mechanical and Power			
1	Chassis Assembly	—	—
1a	Chassis door (left cover)	A6068-62004	—
1b	465W power supply assembly	A6068-00006	—
1c	PCI fan (92mm) and speaker assembly	A6068-62016	—
1d	Rear system fan (120mm)	A6068-62015	—
1e	Hard disk drive fan (60mm)	A6068-62014	—
1f	Chassis beam assembly with graphics card retainer	A6068-62012	—
1g	Bezel assembly with fillers for bays	A6068-62011	—
NS	3V lithium battery, CR2032	1420-0356	—
NS	Control Panel PCB and harness	A6068-63009	—
System Board and Processors			
2	x4000 System Board	A6068-63013	A6068-69013
2a	Intel P4 Xeon, 1.5 GHz	A6078-63001	A6078-69001
2a	Intel P4 Xeon, 1.7 GHz	A6079-63001	A6079-69001
2b	Processor turbocooler kit	A6068-63109	—
NS	Heatsink retainer clip	1205-1290	—
NS	Thermal interface film	A6068-40009	—
Memory			
3	Memory Extender Card (MEC)	A6068-66540	A6068-69540
NS	128 MB RIMM, PC800 ECC RDRAM	A6081-63001	A6081-69001
NS	256 MB RIMM, PC800 ECC RDRAM	A6082-63001	A6082-69001
NS	Continuity modules, RDRAM, (CRIMM)	1818-7718	—
NS	5V Voltage regulator module (VRM for MEC)	0950-4049	—
NS	**x4000 Cable Kit includes:** • IDE floppy cable • SCSI hard disk drive cable with terminator • ATA CD-ROM cable • CD audio cable (can be ordered separately)	A6068-62006 8120-8740	—

Table 3-1 **Parts List**

Item	Description		Replacement Part Number	Exchange Part Number
NS	**x4000 Miscellaneous Parts Kit:**	**Per kit qty.**	**A6068-67901**	—
	• Tamper detect switch assy • Keylock and keys • Cable routing clip • Rails, no screw (3.25" and 5.25" devices) • EFI metal filler, drive bays • Assorted ground clips • Blank PCI cover plate • Rubber foot • System board pullback screw • T15 screw • Rear I/O gasket assy	1 1 4 4 2 35 2 4 3 1 1	5064-2645 1400-1675M	
NS	**Floppy disk drive** Floppy filler plate Label set	 1 1	D2035-60282	—
NS	**Hard disk drives:**			
	18 GB SCSI U160 10k rpm		P1576-63001	P1576-69001
	36 GB SCSI U160 10k rpm		P1577-63001	P1577-69001
NS	**Optical drives:**			
	CD-RW 12X		C4502-60001	C4502-69201
	CD-ROM 48X IDE drive		D4389-60091	—
	DVD-ROM 12X IDE drive		D4388-60004	D4388-69004
NS	**Graphics cards & cables:**			
	Matrox Millennium G450 AGP 16MB Dual nVidia Quadro2-Pro nVidia Quadro2-MXR FireGL 2 FireGL 4 Dongle, DVI-DB15 cable converter for Quadro2-MXR graphics card		5065-4272 A6065-66510 A6064-60001 A6076-66520 A7226-60001 A6064-63001	P2062-69501 A6065-69510 A6064-69001 A6076-69520 A7226-69001 —
NS	**3-button mouse, PS2 PC99**		A4983-65121	—

Table 3-1 Parts List

Item	Description	Replacement Part Number	Exchange Part Number
NS	**Keyboards:**		
	US English and Chinese (ABA & AB2)	C4742-60101	
	Canadian French (ABC)	C4742-60102	
	German (ABD)	C4742-60103	
	Spanish (ABE)	C4742-60104	
	French (ABF)	C4742-60105	
	Latin America Spanish (ABM)	C4742-60108	
	Swiss (ABP & APQ)	C4742-60111	
	Sweden (ABS)	C4742-60112	
	UK English (ABU)	C4742-60113	
	Italian (ABZ)	C4742-60117	
	Korean (AB1)	C4742-60121	
	Taiwanese (AB0)	C4742-60123	
	Japanese (ABJ)	C4742-60124	
	European English (ABB)	C4742-60142	
NS	**Power Cords:**		
	Korea and Europe (AB1 & ABB)	8120-1689	
	China (AB2)	8120-8376	
	Hong Kong and Singapore (AB5)	8120-8706	
	North America (ABA)	8120-1378	
	Australia (ABG)	8120-1369	
	Japan (ABJ)	8120-4753	
	Argentina (AC8)	8120-6869	
	United Kingdom (ACC)	8120-1351	
	Switzerland (ACD)	8120-2104	
	South Africa (ACQ)	8120-4211	
	South America (AKH)	8120-6980	
	Israel (AKJ)	8120-6800	

Documentation

Table 3-2

Manuals and Documentation

Description	Part Number	Comments
Getting Started Guide	A6068-90000	Paper document
Accessory Installation Guide	A6068-90010	Paper document
Technical Reference Manual		electronic file only
Online documentation (electronic files) can be downloaded from: **www.hp.com/workstations/support**		

Software and Training CDs

Table 3-3   Software and Training CDs

Windows Recovery/Install CD Kits:	Contains:[a]		
	Kit Number	**Windows 2000**	**Windows NT**
English US (ABA)	A6068-95001	A6068-92101	A6068-92137
German (ABD)	A6068-95002	A6068-92103	A6068-92104
French (ABF)	A6068-95003	A6068-92105	A6068-92106
Japanese (ABJ)	A6068-95004	A6068-92107	A6068-92108
English UK (ABU)	A6068-95005	A6068-92109	A6068-92110
English Europe (ABB)	A6068-95006	A6068-92111	A6068-92112
Taiwanese (ABO)	A6068-95007	A6068-92113	A6068-92114
Korean (AB1)	A6068-95008	A6068-92115	A6068-92116
Chinese (AB2)	A6068-95009	A6068-92117	A6068-92118
Canadian French (ABC)	A6068-95010	A6068-92119	A6068-92120
Spain Spanish (ABE)	A6068-95011	A6068-92121	A6068-92122
Latin American Spanish (ABM)	A6068-95012	A6068-92123	A6068-92124
Swiss German (ABP)	A6068-95013	A6068-92125	A6068-92126
Swiss French (ABQ)	A6068-95014	A6068-92127	A6068-92128
Swiss (ABS)	A6068-95015	A6068-92129	A6068-92130
Finnish (ABX)	A6068-95016	A6068-92131	A6068-92132
Italian (ABZ)	A6068-95017	A6068-92133	A6068-92134
Thailand English (AKL)	A6068-95018	A6068-92135	A6068-92136
Training CD	A6068-93000		

a. You cannot order these CDs separately, you must order the kit.